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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/932,290	08/17/2001	Donald Craig Foster	M-11313 US	4763
7663	7590	12/07/2005	EXAMINER	
STETINA BRUNDA GARRED & BRUCKER			GRAYBILL, DAVID E	
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DATE MAILED: 12/07/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/932,290

Applicant(s)

FOSTER, DONALD CRAIG

Examiner

David E. Graybill

Art Unit

2822

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 September 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4 and 6-52 is/are pending in the application.
- 4a) Of the above claim(s) 2,13,18,21,25,27 and 32 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3,4,6-12,14-17,19,20,22-24,26,28-31 and 33-52 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 August 2004 and 25 February 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submissions filed on 2-25-5 and 9-28-5 have been entered.

Claims 21 and 27 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected species, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 9-28-5.

The amendments filed 8-24-4 and 2-25-5 are objected to under 35 U.S.C. 132 because they introduce new matter into the disclosure. 35 U.S.C. 132 states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is, in the amendment filed 8-24-4, drawing FIG. 12A, and all of the specification amendments directed to FIG. 12A, and in the amendment filed 2-25-5, drawing FIG. 12B, and all of the specification amendments directed to FIG. 12B. To further clarify, there is no original disclosure of chip 1402 mounted on a non-downset die pad 212.

Applicant is required to cancel the new matter in the reply to this Office Action.

In the rejections infra, generally, reference labels are recited only for the first recitation of identical claim elements.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 6-12, 14, 16, 17, 19, 23, 24, 29, 30, 31 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka (JP10135399) and Tanaka (JP61170053).

In the English abstracts, English translation and drawings, Tanaka '399 discloses the following:

A leadframe comprising: a plurality of leads, each lead comprising a first surface, an opposite second surface, an inner end segment 19 which

defines an inner end of the lead, and an outer portion (between 19 and 16) extending from the inner end segment, wherein a first subset of the leads each include a recess 19a in the first surface of the lead at the inner end segment, a second subset of the leads, and the individual leads of the first subset are situated in an alternating lateral pattern with the individual leads of the second subset; a plurality of electrical conductors 24, wherein the inner end segments are respectively electrically connected to a semiconductor chip 22 by one of said plurality of electrical conductors; where at least some of the plurality of electrical conductors 24a are respectively electrically connected within the recess of the respective inner end segment.

A leadframe comprising: a plurality of pairs of adjacent metal leads, wherein each lead includes an inner end segment which defines an inner end of the lead and has a recessed surface, and an outer portion extending from the inner end segment; a plurality of electrical conductors, wherein the inner end segments of the leads are respectively electrically connected to a semiconductor chip by one of said plurality of electrical conductors, and at least some of said plurality of electrical conductors are connected to the recessed surface of the respective inner end segment; a dam bar 16 connected to the outer segment of the leads.

A leadframe comprising: a plurality of adjacent pairs of leads each including an inner end segment which defines an inner end of the lead and has a recessed surface, and an outer portion extending from the inner segment; a plurality of electrical conductors, wherein the inner end segments of the pairs of adjacent leads are respectively electrically connected to a semiconductor chip by one of said plurality of electrical conductors, and at least some of said plurality of electrical conductors are connected to the recessed surface of the respective inner end segment.

A semiconductor package comprising: a plurality of adjacent pairs of leads each including an inner end segment which defines an inner end of the lead and has a recessed surface, and an outer portion extending from the inner segment; a semiconductor chip in an electrical connection with the inner end segments of the leads; and a hardened encapsulant material 26 covering the semiconductor chip and the inner end segments of the leads; wherein the electrical connection comprises a plurality of electrical connectors bonded between the semiconductor chip and the inner end segments, wherein at least some of said electrical conductors are bonded to the recessed surface of the respective inner end segment.

A semiconductor package comprising: a plurality of pairs of adjacent metal leads, wherein each lead includes an inner end segment which defines an inner end of the lead and has a recessed surface, and an outer portion

extending from the inner end segment; a semiconductor chip in an electrical connection with the inner end segments of the leads; and a hardened encapsulant material covering the semiconductor chip, the conductors, and the inner end segments of the leads; wherein the electrical connection comprises a plurality of metal wires bonded between the semiconductor chip and the inner end segments, wherein at least some of said wires are bonded to the recessed surface of the respective inner end segment.

However, Tanaka '399 does not appear to explicitly disclose wherein a second subset of the leads each include a recess in the second surface of the lead at the inner end segment; said inner end segments each including a recessed surface; wherein each recess has a vertical depth that is more than half of a vertical height of the lead.

Nonetheless, in the English abstract and drawings, Tanaka '053 discloses wherein leads each include a recess in the second surface of the lead at the inner end segment 2; said inner end segments each including a recessed surface; wherein each recess has a vertical depth that is more than half of a vertical height of the lead. Moreover, it would have been obvious to combine this disclosure of Tanaka '053 with the disclosure of Tanaka '399 so that the second subset of the leads each include a recess in the second surface of the lead at the inner end segment (see Drawing 3), and wherein each recess of has a vertical depth that is more than half of a vertical height

of the lead, because it would provide a narrow lead interval which is disclosed as desirable by both Tanaka '399 and Tanaka '053.

However, the combination of applied prior art does not appear to explicitly disclose that the leads are situated such that the recesses in the inner end segments of the leads of any pair of adjacent leads are oriented in opposite directions; wherein the recessed surfaces of the leads of each said pair of adjacent leads are spaced apart a first distance in a vertical direction; wherein the first distance is greater than half a vertical height of an unrecessed portion of the lead; and the recessed surfaces of the inner end segments of the leads of each of the pairs being oppositely oriented.

Nevertheless, these limitations are inherent properties of the product of the combination of applied prior art.

Also, the combination of applied prior art does not appear to explicitly disclose wherein the second distance is approximately zero; and wherein the second distance is zero.

Regardless, both Tanaka '399 and Tanaka '053 disclose the desirability of narrow lead intervals; thus, they disclose that horizontal lead distance is a result-effective variable. Moreover, it would have been an obvious matter of design choice bounded by well known manufacturing constraints and ascertainable by routine experimentation and optimization to choose the particular claimed horizontal lead distance limitations because applicant has

not disclosed that the limitations are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical, and it appears prima facie that the process would possess utility using another distance. Indeed, it has been held that optimization of range limitations are prima facie obvious absent a disclosure that the limitations are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical. See MPEP 2144.05(II): "Generally, differences in concentration or temperature will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical. '[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.'" In re Aller, 220 F.2d 454, 105 USPQ 233, 235 (CCPA 1955). See also In re Hoeschele, 406 F.2d 1403, 160 USPQ 809 (CCPA 1969), Merck & Co. Inc. v. Biocraft Laboratories Inc., 874 F.2d 804, 10 USPQ2d 1843 (Fed. Cir.), cert. denied, 493 U.S. 975 (1989), and In re Kulling, 897 F.2d 1147, 14 USPQ2d 1056 (Fed. Cir. 1990). As set forth in MPEP 2144.05(III), "Applicant can rebut a prima facie case of obviousness based on overlapping ranges by showing the criticality of the claimed range. 'The law is replete with cases in which the difference between the claimed invention and the prior art is some range or other variable within the claims. . . . In such a situation, the applicant must

show that the particular range is critical, generally by showing that the claimed range achieves unexpected results relative to the prior art range.’ In *re* Woodruff, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990). See MPEP § 716.02 - § 716.02(g) for a discussion of criticality and unexpected results.” Similarly, it has been held that mere dimensional limitations are *prima facie* obvious absent a disclosure that the limitations are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical. See, for example, *In re* Rose, 220 F.2d 459, 105 USPQ 237 (CCPA 1955); *In re* Rinehart, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976); *Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 469 U.S. 830, 225 USPQ 232 (1984); *In re* Dailey, 357 F.2d 669, 149 USPQ 47 (CCPA 1966).

Furthermore, although the combination of applied prior art does not appear to explicitly disclose that the first distance is greater than a second distance in a horizontal direction between closest portions of the recessed surfaces of the leads of each of the pairs of adjacent leads, this is an inherent property of the product of the combination of applied prior art because the first distance is inherently greater than the second distance of approximately zero.

Claims 4, 22, 28, 35, 40, 43, 46 and 52 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Tanaka and

Tanaka as applied to claims 1, 9, 17, 23 and 29, and further in combination with Tanigawa (JP03245560).

As cited, Tanaka and Tanaka disclose wherein the inner end of each of the leads is of a first width, and at least a portion of the outer portion of each of the leads is of a second width; wherein the inner end segment of each of the leads is of a first width, and at least a portion of the outer portion of each of the leads is of a second width; wherein the inner ends of the leads of the first and second subset extend toward a center of the leadframe; wherein the inner end of each lead of each said pair extends toward a center of the leadframe; wherein the inner end each lead of each said pair extends toward the semiconductor chip.

However, the combination of Tanaka and Tanaka do not appear to explicitly disclose wherein at least a portion of the outer portion of each of the leads is of a second width which is less than the first width; wherein at least a portion of the outer portion of each of the leads is of a second width which is less than the first width; wherein the inner ends of the leads of the first subset extend further toward a center of the leadframe than the inner ends of the leads of the second subset; wherein the inner end of one lead of each said pair extends further toward a center of the leadframe than the inner end of the other lead of the pair; wherein the inner end of one lead of

each said pair extends further toward the semiconductor chip than the inner end of the other lead of the pair.

Still, in the English abstract and drawings, Tanigawa discloses wherein a width of the inner end segments 4 is greater than a width of the first portion 5 of the leads 3; wherein a width of the inner end segments is greater than a width 5 of the lead outward of the inner end segment; and wherein a width of the inner end segment is greater than a width of the lead outward of the inner end segment; wherein the inner ends of the leads of a first subset extend further toward a center of the leadframe 1 than the inner ends of the leads of a second subset; wherein the inner end of one lead of each of a pair extends further toward a center of the leadframe than the inner end of the other lead of the pair.

In addition, it would have been obvious to combine this disclosure of Tanigawa with the disclosure of the combination of Tanaka and Tanaka because it would provide a desirable narrow lead interval.

Claims 36, 38, 41, 44, 47 and 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Tanaka and Tanaka as applied to claims 1, 9, 17, 23 and 29, and further in combination with Miyamoto (JP03024754).

As cited supra, the combination of Tanaka and Tanaka discloses wherein the recesses of the second subset of the leads extend to the inner

end of the lead; wherein the recessed surface of the other lead of the pair extends to the inner end of the lead.

However the combination of Tanaka and Tanaka do not appear to explicitly disclose where the inner end segments of the leads of the first subset include a pedestal between the inner end of the lead and the recess; wherein one lead of each said pair includes a pedestal between the inner end of the lead and the recessed surface.

Notwithstanding, in the English abstract and drawings, Miyamoto discloses where the inner end segments of the leads 2 of a first subset include a pedestal 2b between the inner end of the lead and the recess 2a; wherein one lead of a pair includes a pedestal between the inner end of the lead and the recessed surface. Furthermore, it would have been obvious to combine this disclosure with the disclosure of the applied prior art because it would enable stable loop formation.

Claims 37, 39, 42, 45, 48, 49 and 51 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Tanaka, Tanaka and Miyamoto, as applied to claims 36, 38, 41, 44, 47 and 50, and further in combination with Handa (JP59129451).

As cited, the combination of Tanaka, Tanaka and Miyamoto inherently discloses wherein the electrical connection to the lead of the pair having the

pedestal is located at the pedestal because the pedestal is inherently electrically connected to the lead.

However, the combination of Tanaka, Tanaka and Miyamoto does not appear to explicitly disclose wherein the inner ends of the leads of the first subset extend further toward a center of the leadframe than the inner ends of the leads of the second subset; wherein the inner end of one lead of each said pair extends further toward a center of the leadframe than the inner end of the other lead of the pair.

Regardless, in the English abstract and drawings, Handa discloses wherein the inner ends of the leads 5 of a first subset extend further toward a center of a leadframe than the inner ends of the leads 6 of the second subset; wherein the inner end of one lead of each said pair extends further toward a center of the leadframe than the inner end of the other lead of the pair. Moreover, it would have been obvious to combine this disclosure of Handa with the disclosure of the applied prior art because it would improve connection reliability.

Claims 3, 15, 20, 26 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Tanaka and Tanaka as applied to claims 1, 9, 17, 23 and 29, and further in combination with Miyamoto (JP03024754) and Handa (JP59129451).

The combination of Tanaka and Tanaka does not appear to explicitly disclose wherein the recess of the inner end segment of the leads of the first subset does not extend to the inner end of the lead, and the leads of the first subset extend further toward a center of the leadframe than the leads of the second subset; wherein the recessed surface of one of the leads of the pairs does not extend to the inner end of the lead, and those leads extend further toward a center of the leadframe than the other lead of the respective pair; wherein the recessed surface of one of the leads of the pairs does not extend to the inner end of the lead, and those leads extend further toward the semiconductor chip than the other lead of the respective pair.

Nonetheless, as cited *supra*, Miyamoto and Handa disclose these limitations, and they are applied to the rejection for the same reasons they were applied to the rejection of claims 37, 39, 42, 45, 48 and 51.

Claims 17 and 20 are rejected under 35 U.S.C. 102(b) as being anticipated by Gursky (4283839).

At column 6, lines 5-30; column 7, lines 20-44, 57 and 58; column 8, lines 7-13 and 27-35; and column 8, line 47 to column 9, line 9, Gursky discloses the following:

A leadframe comprising: a plurality of adjacent pairs of leads 28, 30 each including an inner end segment which defines an inner end 36 of the lead and has a recessed surface 39, 44, and an outer portion extending from

the inner segment, and the recessed surfaces of the inner end segments of the leads of each of the pairs being oppositely oriented; wherein the recessed surface of one of the leads (28/30) of the pairs does not extend to the inner end of the lead, and those leads extend further toward a "center" of the leadframe than the other lead (the other of 28 or 30) of the respective pair; wherein a semiconductor chip 52 is in a flip chip electrical connection with the inner end segments.

To further clarify the disclosure of an outer portion extending from the inner segment, as cited, Gursky discloses that 39 and 44 can be located elsewhere than at fixed ends 34 of the leads. Therefore, when 44 is located elsewhere than at fixed ends 34 of the leads, there is an inherent outer portion extending from the inner segment.

To further clarify the disclosure that those leads (28/30) extend further toward a center of the leadframe than the other lead (the other of 28 or 30) of the respective pair, it is noted that leads 28 extend a greater distance along the greater lengths of the leads toward the center than leads 30, and leads 30 extend to a more advanced point toward the center than leads 28.

Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Gursky (4283839) and Drees (4026008).

As cited *supra*, Gursky discloses a semiconductor package comprising: a plurality of adjacent pairs of leads each including an inner end segment which defines an inner end of the lead and has a recessed surface and an outer portion extending from the inner segment, and the recessed surfaces of the inner end segments of the leads of each of the pairs being oppositely oriented; a semiconductor chip in an electrical connection with the inner end segments of the leads; and an encapsulant material; wherein the semiconductor chip is in a flip chip electrical connection with the inner end segments.

To further clarify the disclosure of an encapsulant material, Gursky discloses "encapsulation steps," and an encapsulant material is an inherent result of the encapsulation steps.

However, Gursky does not appear to explicitly disclose a hardened encapsulant material covering the semiconductor chip, the conductors, and the inner end segments of the leads.

Still, at column 6, lines 5-55, Drees discloses a hardened encapsulant material 19 covering the semiconductor chip 17, the conductors 18, and the inner end segments of the leads. Furthermore, it would have been obvious to combine this disclosure of Drees with the disclosure of Gursky because it would enable the encapsulation of Gursky.

To further clarify the disclosure of a hardened encapsulant material this is an inherent result of the "injection molding process" of Drees.

Applicant's amendment and remarks filed 2-25-5 have been fully considered, are addressed by the rejections *supra*, and are further addressed *infra*.

Applicant asserts that Tanaka teaches away from the claims because, allegedly, Tanaka '053 discloses that the recesses are intended to be formed consistently on only one side of the leads.

This assertion is respectfully traversed because Tanaka is not necessarily applied to the rejection for the alleged disclosure that the recesses are intended to be formed consistently on only one side of the leads, and the alleged disclosure, in combination with the applied prior art, would not otherwise teach away from the claims.

In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

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have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Alternatively, applicant may contact the File Information Unit at (703) 308-2733. Telephone status inquiries should not be directed to the examiner. See MPEP 1730VIC, MPEP 203.08 and MPEP 102.

Any other telephone inquiry concerning this communication or earlier communications from the examiner should be directed to David E. Graybill at (571) 272-1930. Regular office hours: Monday through Friday, 8:30 a.m. to 6:00 p.m.
The fax phone number for group 2800 is (571) 273-8300.



David E. Graybill
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Art Unit 2822

D.G.
1-Dec-05